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### Understanding the Risk of Bat Coronavirus Emergence

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Project Number

1R01AI110964-01

Contact PI/Project Leader

DASZAK, PETER

Awardee Organization

ECOHEALTH ALLIANCE, INC.

#### Description

##### Abstract Text

DESCRIPTION (provided by applicant): This project will examine the risk of future coronavirus (CoV) emergence from wildlife using in-depth field investigations across the human-wildlife interface in China, molecular characterization of novel CoVs and host receptor binding domain genes, mathematical models of transmission and evolution, and in vitro and in vivo laboratory studies of host range. Zoonotic CoVs are a significant threat to global health, as demonstrated with the emergence of pandemic severe acute respiratory syndrome coronavirus (SARS-CoV) in China in 2002, and the recent and ongoing emergence of Middle East Respiratory Syndrome (MERS-CoV). Bats appear to be the natural reservoir of these viruses, and hundreds of novel bat-CoVs have been discovered in the last two decades. Bats, and other wildlife species, are hunted, traded, butchered and consumed across Asia, creating a large scale human-wildlife interface, and high risk of future emergence of novel CoVs. This project aims to understand what factors increase the risk of the next CoV emerging in people by studying CoV diversity in a critical zoonotic reservoir (bats), at sites of high risk for emergence (wildlife markets) in an emerging disease hotspot (China). The three specific aims of this project are to: 1. Assess CoV spillover potential at high risk human-wildlife interfaces in China. This will include quantifying the nature and frequency of contact people have with bats and other wildlife; serological and molecular screening of people working in wet markets and highly exposed to wildlife; screening wild-caught and market sampled bats from 30+ species for CoVs using molecular assays; and genomic characterization and isolation of novel CoVs. 2. Develop predictive models of bat CoV emergence risk and host range. A combined modeling approach will include phylogenetic analyses of host receptors and novel CoV genes (including functional receptor binding domains); a fused ecological and evolutionary model to predict host-range and viral sharing; and mathematical matrix models to examine evolutionary and transmission dynamics. 3. Test predictions of CoV inter-species transmission. Predictive models of host range (i.e. emergence potential) will be tested experimentally using reverse genetics, pseudovirus and receptor binding assays, and virus infection experiments across a range of cell cultures from different species and humanized mice.

##### Public Health Relevance Statement

PUBLIC HEALTH RELEVANCE: Most emerging human viruses come from wildlife, and these represent a significant threat to global public health and biosecurity - as demonstrated by the SARS coronavirus pandemic of 2002-03 and an ongoing SARS-like epidemic in the Middle East. This project seeks to understand what factors allow animal Coronaviruses to evolve and jump into the human population by studying virus diversity in a critical group of animals (bats), a sites of high risk for emergence (wildlife markets) in an emerging disease hotspot (China).

##### NIH Spending Category

Biotechnology

Emerging Infectious Diseases

Genetics

Infectious Diseases

## Project Terms

Affect   Animals   Asia   Binding   Binding Sites   Biological Assay  
Blood specimen   Cell Culture Techniques   Cell Line   Cells   Chimeric Proteins  
China   Chiroptera   Clinical   Coronavirus   Data   Dipeptidyl-Peptidase IV  
Disease   Ecosystem   Epidemic   Evolution   Exposure to   Frequencies  
Future   Genbank   Genes   Genetic   Genetic Recombination  
Genetic Variation   Genomics   Human   Human Virus   In Vitro   Infection  
Interview   Investigation   Laboratory Study   Life   Mammals   Marketing  
Middle East   Modeling   Molecular   Mus   Nature   Occupational Exposure  
  
Read More

## Details

### Contact PI/ Project

#### Leader

Name  
**DASZAK, PETER**  
Title  
**PRESIDENT**  
Contact  
  
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### Other PIs

Not Applicable

### Program Official

Name  
**STEMMY, ERIK J**  
Contact  
  
View Email

## Organization

Name <b>ECOHEALTH ALLIANCE, INC.</b>	Department Type <b>Unavailable</b>	State Code <b>NY</b>
City <b>NEW YORK</b>	Organization Type <b>Other Domestic Non-Profits</b>	Congressional District <b>12</b>
Country <b>UNITED STATES (US)</b>		

## Other Information

FOA <b><u>PA-11-260</u></b>	Administering Institutes or Centers <b>NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES</b>	Project Start Date <b>01-June-2014</b>
Study Section <b><u>Clinical Research and Field Studies of Infectious Diseases Study Section</u></b> <b><u>CRFS</u></b>	CFDA Code <b>855</b>	Project End Date <b>31-May-2019</b>
Award Notice Fiscal Year <b>2014</b>	DUNS Number <b>077090066</b>	Budget Start Date <b>01-June-2014</b>
Date <b>27-May-2014</b>	UEI <b>TKS7NBB4JDN</b>	Budget End Date <b>31-May-2015</b>

## Project Funding Information for 2014

Total Funding <b>\$666,442</b>	Direct Costs <b>\$516,857</b>	Indirect Costs <b>\$149,585</b>
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Year	Funding IC
2014	NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES \$666,442

Funding IC	FY Total Cost by IC	NIH Spending Category
NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES	\$666,442	Biotechnology; Emerging Infectious Diseases; Genetics; Infectious Diseases;

## Sub Projects

No Sub Projects information available for 1R01AI110964-01

## Publications

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No Publications available for 1R01AI110964-01

## Patents

No Patents information available for 1R01AI110964-01

## Outcomes

The Project Outcomes shown here are displayed verbatim as submitted by the Principal Investigator (PI) for this award. Any opinions, findings, and conclusions or recommendations expressed are those of the PI and do not necessarily reflect the views of the National Institutes of Health. NIH has not endorsed the content below.

No Outcomes available for 1R01AI110964-01

## Clinical Studies

No Clinical Studies information available for 1R01AI110964-01

## News and More

### Related News Releases

No news release information available for 1R01AI110964-01

## History

No Historical information available for 1R01AI110964-01

### Similar Projects

No Similar Projects information available for 1R01AI110964-01